Econometric Analysis (2011)

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Final Exam

An unobserved effects model explaining current murder rates in terms of the number of executions in the last three years is

$$mrdrte_{it} = \theta_t + \beta_1 exec_{it} + \beta_2 unem_{it} + c_i + u_{it}$$

where $mrdrte_{it}$ is the number of murders in state i during year t, per 10,000 people; $exec_{it}$ is the total number of executions for the current and prior two years; $unem_{it}$ is the current unemployment rate included as a control; c_i is state-specific effect; and u_{it} is the error term.

(1) State precisely the definition of a random effect model and a fixed effect model respectively.

(2) Explain how to estimate the equation by pooled OLS. Which assumptions are needed for consistency and asymptotic normality? Explain.

(3) Assuming a random effect model, explain how to estimate the equation. Which assumptions are needed for consistency and asymptotic normality? Explain.

(4) Explain how to estimate the equation by first differencing. Which assumptions are needed for consistency and asymptotic normality? Explain.

(5) Explain how to estimate the equation by fixed-effect transformation. Which assumptions are needed for consistency and asymptotic normality? Explain.

(6) Explain carefully how to choose your estimator. (hint: which test do you use? What is the null hypothesis?)